

Remarks

The Examiner objected to claims 44, 46, 48, 50, 52, 60, 61, 65, 67 and 69 “as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims”. In response:

claims 44, 46, 48, 50, and 52 were combined and so rewritten in independent form as new claim 76, so that claim 76 is in condition for allowance;

claims 60 and 61 were combined and so rewritten in independent form as new claim 80, so that claim 80 is in condition for allowance; and

claims 65, 67 and 69 were combined and so rewritten in independent form as amended claim 63, so that claim 63 is in condition for allowance, as are claims 70-71 and 74-75 which depend from claim 63.

Claim 34 is the same claim as the originally filed claim 54 written in independent form.

Claim 41 has been written in independent form and is otherwise the same claim 41 that was originally filed.

The Examiner rejected claim 41 under 35 U.S.C. § 112, second paragraph.

The Examiner rejected claims 34-41, 47, 49, 51, 54, 63-64, 66, 68 and 71-75 under 35 U.S.C. § 102(b) as allegedly being anticipated by Bennett *et al.* (US 3,842,495).

The Examiner rejected claims 34-43, 45, 53-59, 62, 63 and 70-75 under 35 U.S.C. § 102(b) as allegedly being anticipated by Chapel Jr., *et al.* (US 4,907,341).

Applicants respectfully traverse the § 112 rejections and the § 102 rejections with the following arguments.

35 U.S.C. § 112, Second Paragraph

The Examiner rejected claim 41 under 35 U.S.C. § 112, second paragraph, as allegedly “being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.”

The Examiner argues: “In claim 41, the recitation of “a product of F and L” renders the claim indefinite because it is unclear for what “a product” of a fraction L of the length L of a portion of the resistor represented. Does Applicant mean the length of the portion heated by the laser radiation? Clarification is needed.”

In response, Applicant respectfully contends that “a product of F and L” means a result obtained from multiplying F and L together, because the definition of “product” is “the result obtained by multiplying two or more quantities together”. Webster’s New World Dictionary 1074 (3d ed. 1988).

As an example, if $L = 5$ microns and $F = 0.40$, then the product of F and L is 2 microns (i.e., the result from multiplying 0.40 by 5 microns).

Since the fraction F denotes the fraction of the length L (where L is the length of the resistor) onto which the laser radiation is directed (see claim 34 from which claim 41 depends), the product of F and L is a length within the resistor (in linear units such as microns, angstroms, millimeters, etc.) onto which the laser radiation is directed. In the preceding example, the laser radiation is directed onto 2 microns of length within the 5-micron resistor.

Therefore, the recited “product of F and L” is not indefinite.

Accordingly, Applicants respectfully request that the rejection of claim 41 under 35 U.S.C. § 112, second paragraph be withdrawn.

35 U.S.C. § 102(b): Inherency

In the Office Action, the Examiner has repeatedly made arguments of inherency in rejecting claims under 35 U.S.C. § 102(b). In order to properly evaluate the Examiner's arguments based on inherency, Applicants next set forth the pertinent law regarding the legal standards for proving inherency.

Under case law, the alleged inherency must **necessarily and inevitably** follow from the teachings in the prior art and a high probability of occurrence is not sufficient demonstrating inherency. See MPEP 2112(IV) which recites: "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is **necessarily** present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)... "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic **necessarily** flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original)" (emphasis added).

35 U.S.C. § 102(b): Bennett

The Examiner rejected claims 34-41, 47, 49, 51, 54, 63-64, 66, 68 and 71-75 under 35 U.S.C. § 102(b) as allegedly being anticipated by Bennett *et al.* (US 3,842,495).

Claim 41

Claim 41 has been written in independent form and is otherwise the same claim 41 that was originally filed.

Applicants respectfully contend that Bennett does not anticipate claim 41, because Bennett does not teach each and every feature of claim 41.

As a first example of why Bennett does not anticipate claim 34, Bennett does not teach the feature: “wherein a product of F and L does not exceed about 1 micron”.

The Examiner argues: “Regarding claim 41, as the claim being best understood, "about 1 micron" is a very small value and in Bennett et al, at the time the laser beam caused to impinge on the resistor, the beam impingement spot is inherently small and within the dimension or length of "about 1 micron".”

In response, Applicants assert that the Examiner has not demonstrated that a product of F and L not exceeding about 1 micron **necessarily and inevitably** follows from the teachings in Bennet, as is required by the legal standard for proving inherency. Thus, the Examiner’s argument of inherency is not persuasive.

Therefore, Bennett does not teach the preceding feature of claim 41.

As a second example of why Bennett does not anticipate claim 41, Bennett does not teach the feature: “wherein the laser radiation heats the portion of the resistor such that the electrical resistance $R(t)$ instantaneously changes at a rate dR/dt ”.

The Examiner argues that Bennet shows “the laser radiation heats the portion of the resistor 19 such that the electrical resistance $R(t)$ instantaneously changes at a rate $Dr./dt$ (set forth at the previous note at column 3, lines 39-42 and further at lines 52-56, i.e., depending on the amount of resistance desired and the intensity of the laser radiation or beam). ”

In response, Applicants note that Bennett, col. 3, lines 37-42 recites: “Turning to FIG. 5, it shows the use of a laser beam 130 emanating from source or generator 131 and directed to impinge on the resistance element 19, thereby to effect a change in the electrical resistance of the precision resistor to a desired value at a temperature or temperatures within the range of interest.” Applicants assert that the preceding quote from Bennet col. 3, lines 37-42 does not teach that the laser beam 130 heats the resistance element 19.

In further response, Applicants note that Bennett, col. 3, lines 52-56 recites: “Typically, beam impingement on the relatively moving resistance element is continued for a time interval of between 0.10 and 60 seconds, depending on the amount of resistance increase desired, and the intensity of the beam.” Applicants assert that the preceding quote from Bennet col. 3, lines 52-56 does not teach that the laser beam 130 heats the resistance element 19.

Applicants additionally contend that it is not inherent that the laser beam 130 would heat the resistance element 19, because it is well known in the art that a laser beam may cool a material that the laser beam strikes and interacts with. For example, see United States Patent

5,615,558 issued April 1, 1997 to Cornell et al. and entitled “Optical Cooling of Solids”. The Abstract of United States Patent 5,615,558 recites: “A device and method for *laser cooling* of a solid to extremely low temperature is disclosed, the device including an active cooling structure having a high purity surface passivated direct band gap semiconductor crystal of less than about 3 microns thick and a transparent hemispherical body in optical contact with the crystal. The crystal is itself cooled when illuminated with a laser beam tuned to a frequency no greater than the band gap edge frequency of the crystal. Cooling is caused by emission of photons of higher energy than photons entering the crystal, the additional energy being accounted for by process of absorption of thermal phonons from the crystal lattice.” (emphasis added).

Therefore, Bennett does not teach the preceding feature of claim 41.

Based on the preceding arguments, Applicants respectfully maintain that Bennett does not anticipate claim 41, and that claim 41 is in condition for allowance.

Claims 34-40, 47, 49, 51, and 54

Claim 54 has been canceled, and claim 34 is the same claim as the originally filed claim 54 written in independent form.

Applicants respectfully contend that Bennett does not anticipate claim 34, because Bennett does not teach each and every feature of claim 34.

As a first example of why Bennett does not anticipate claim 34, Bennett does not teach the feature: “wherein the resistor is coupled to a semiconductor substrate”.

The Examiner argues: “Bennett et al further shows that the resistor 19 can be coupled to a semiconductor substrate through electrode plates or leads 21.”

In response, Applicants assert that the preceding feature of claim 34 requires the resistor to be **coupled** to a semiconductor substrate, which the Examiner does not allege and which Bennett does not teach.

Therefore, Bennett does not teach the preceding feature of claim 34.

As a second example of why Bennett does not anticipate claim 34, Bennett does not teach the feature: “wherein the laser radiation heats the portion of the resistor such that the electrical resistance $R(t)$ instantaneously changes at a rate dR/dt ”.

The Examiner argues that Bennet shows “the laser radiation heats the portion of the resistor 19 such that the electrical resistance $R(t)$ instantaneously changes at a rate dR/dt (set forth at the previous note at column 3, lines 39-42 and further at lines 52-56, i.e., depending on the amount of resistance desired and the intensity of the laser radiation or beam).”

In response, Applicants note that Bennett, col. 3, lines 37-42 recites: “Turning to FIG. 5, it shows the use of a laser beam 130 emanating from source or generator 131 and directed to impinge on the resistance element 19, thereby to effect a change in the electrical resistance of the precision resistor to a desired value at a temperature or temperatures within the range of interest.” Applicants assert that the preceding quote from Bennet col. 3, lines 37-42 does not teach that the laser beam 130 heats the resistance element 19.

In further response, Applicants note that Bennett, col. 3, lines 52-56 recites: “Typically, beam impingement on the relatively moving resistance element is continued for a time interval of

between 0.10 and 60 seconds, depending on the amount of resistance increase desired, and the intensity of the beam.” Applicants assert that the preceding quote from Bennet col. 3, lines 52-56 does not teach that the laser beam 130 heats the resistance element 19.

Applicants additionally contend that it is not inherent that the laser beam 130 would heat the resistance element 19, because it is well known in the art that a laser beam may cool a material that the laser beam strikes and interacts with. For example, see United States Patent 5,615,558 issued April 1, 1997 to Cornell et al. and entitled “Optical Cooling of Solids”. The Abstract of United States Patent 5,615,558 recites: “A device and method for *laser cooling* of a solid to extremely low temperature is disclosed, the device including an active cooling structure having a high purity surface passivated direct band gap semiconductor crystal of less than about 3 microns thick and a transparent hemispherical body in optical contact with the crystal. The crystal is itself cooled when illuminated with a laser beam tuned to a frequency no greater than the band gap edge frequency of the crystal. Cooling is caused by emission of photons of higher energy than photons entering the crystal, the additional energy being accounted for by process of absorption of thermal phonons from the crystal lattice.” (emphasis added).

Therefore, Bennett does not teach the preceding feature of claim 34.

Based on the preceding arguments, Applicants respectfully maintain that Bennett does not anticipate claim 34, and that claim 34 is in condition for allowance. Since claims 35-40, 47, 49, 51 and 54 depend from claim 34, Applicants contend that claims 35-40, 47, 49, 51 and 54 are likewise in condition for allowance.

In addition with respect to claim 35, Bennett does not teach the feature: “wherein the resistor comprises a first cell and a second cell, wherein the second cell is in direct mechanical contact with the first cell, wherein the first cell and the second cell are each totally within the portion of the resistor, wherein the first cell comprises a first material that is distributed throughout the first cell, wherein the second cell comprises a second material that is distributed throughout the second cell, wherein the first cell does not comprise the second material, wherein the second cell does not comprise the first material, and wherein the first material is the second material structurally changed by the laser radiation ”.

In addition with respect to claim 47, Bennett does not teach the feature: “wherein the first material is an amorphous metallic material, wherein the second material is a crystalline metallic material, and wherein the crystalline metallic material has resulted from an interaction of the laser radiation with the amorphous metallic material”.

In addition with respect to claim 49, Bennett does not teach the feature: “wherein the first material is a polycrystalline metal having a first crystalline phase, wherein the second material is a second crystalline phase of the polycrystalline metal, and wherein the second phase of the polycrystalline metal has resulted from an interaction of the laser radiation with the first phase of the polycrystalline metal”.

In addition with respect to claim 51, Bennett does not teach the feature: “wherein the first material is a metallic oxide selected from the group consisting of a metal oxide and a metallic

alloy oxide, wherein the second material is a metallic component, wherein the metallic component is a metal if the metallic oxide is the metal oxide, wherein the metallic component is a metallic alloy if the metallic oxide is the metallic alloy oxide, and wherein the metallic component has resulted from an interaction of the laser radiation with the metallic oxide”.

Claims 63-64, 66, 68, and 71-75

Since claims 64, 66, 68, and 72-73 have been canceled, the rejection of claims 64, 66, 68, and 72-73 as allegedly anticipated by Bennett is moot.

The Examiner objected to claims 65, 67 and 69 “as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims”. In response, claims 65, 67 and 69 were combined and so rewritten in independent form as amended claim 63, so that claim 63 is in condition for allowance, as are claims 71-72 and 74-75 which depend from claim 63.

35 U.S.C. § 102(b): Chapel

The Examiner rejected claims 34-43, 45, 53-59, 62, 63 and 70-75 under 35 U.S.C. § 102(b) as allegedly being anticipated by Chapel Jr., *et al.* (US 4,907,341).

Claim 41

Claim 41 has been written in independent form and is otherwise the same claim 41 that was originally filed.

Applicants respectfully contend that Chapel does not anticipate claim 41, because Chapel does not teach each and every feature of claim 41.

As an example of why Chapel does not anticipate claim 34, Chapel does not teach the feature: “wherein a product of F and L does not exceed about 1 micron”.

Based on the preceding arguments, Applicants respectfully maintain that Chapel does not anticipate claim 41, and that claim 41 is in condition for allowance.

Claims 34-40, 42-43, 45, and 53-54

Claim 54 has been canceled, and claim 34 is the same claim as the originally filed claim 54 written in independent form.

Applicants respectfully contend that Chapel does not anticipate claim 34, because Chapel does not teach each and every feature of claim 34.

As an example of why Chapel does not anticipate claim 34, Chapel does not teach the feature: “wherein the resistor is coupled to a semiconductor substrate”.

The Examiner does not allege that Chapel teaches the preceding feature of claim 34.

Based on the preceding arguments, Applicants respectfully maintain that Chapel Jr., does not anticipate claim 34, and that claim 34 is in condition for allowance. Since claims 35-40, 42-43, 45, and 53-54 depend from claim 34, Applicants contend that claims 35-40, 42-43, 45, and 53-54 are likewise in condition for allowance.

In addition with respect to claim 35, Chapel does not teach the feature: “wherein the resistor comprises a first cell and a second cell, wherein the second cell is in direct mechanical contact with the first cell, wherein the first cell and the second cell are each totally within the portion of the resistor, wherein the first cell comprises a first material that is distributed throughout the first cell, wherein the second cell comprises a second material that is distributed throughout the second cell, wherein the first cell does not comprise the second material, wherein the second cell does not comprise the first material, and wherein the first material is the second material structurally changed by the laser radiation ”.

In addition with respect to claim 42, Chapel does not teach the feature: “wherein the resistor includes a layer of a first electrically conductive material coupled to a layer of a second electrically conductive material by a cell of a third electrically conductive material that is totally within the portion of the resistor, and wherein the third electrically conductive material includes a chemical combination of the first electrically conductive material and the second electrically conductive material, wherein the layer of the first electrically conductive material is totally within the portion of the resistor, wherein the layer of the second electrically conductive material is totally within the portion of the resistor, wherein a first bounding surface of the cell is in direct

mechanical contact with the layer of the first electrically conductive material, wherein a second bounding surface of the cell is in direct mechanical contact with the layer of the second electrically conductive material, wherein the first bounding surface of the cell is opposite to and parallel to the second bounding surface of the cell and wherein the third electrically conductive material is distributed throughout the cell”.

Claims 55-59 and 62-63

Applicants respectfully contend that Chapel does not anticipate claim 55, because Chapel does not teach each and every feature of claim 55.

As an example of why Chapel does not anticipate claim 55, Chapel does not teach the features: “wherein a cell $C_{K,K+1}$ couples a cell C_K ’ of the layer K to a cell C_{K+1} ’ of the layer K+1, wherein the cell C_K ’ is totally within the portion of the resistor and includes the material M_K , wherein the cell C_{K+1} ’ is totally within the portion of the resistor and includes the material M_{K+1} , wherein the cell $C_{K,K+1}$ is totally within the portion of the resistor and includes an electrically conductive material $M_{K,K+1}$ that comprises a chemical combination of the material M_K from the layer K and the material M_{K+1} from the layer K+1, and wherein K is selected from the group consisting of 1, 2, ..., N-1, and combinations thereof”.

The Examiner does not allege that Chapel teaches the preceding features of claim 55.

Based on the preceding arguments, Applicants respectfully maintain that Chapel Jr., does not anticipate claim 55, and that claim 55 is in condition for allowance. Since claims 54-59 and 62-63 depend from claim 55, Applicants contend that claims 54-59 and 62-63 are likewise in condition for allowance.

Claims 63 and 70-75

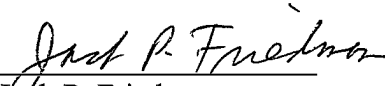
Since claims 72-73 have been canceled, the rejection of claims 72-73 as allegedly anticipated by Chapel is moot.

The Examiner objected to claims 65, 67 and 69 “as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims”. In response, claims 65, 67 and 69 were combined and so rewritten in independent form as amended claim 63, so that claim 63 is in condition for allowance, as are claims 71-72 and 74-75 which depend from claim 63.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 09-0457.

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